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# TRANSMITTAL OF APPEAL BRIEF	Docket No. POF 3.9-057 CONT

In re Application of: Nui Wang

Application No.	Filing Date	Examiner	Group Art Unit
10/776,539	February 9, 2004	B. T. King	3683

Invention: DISC BRAKE CALIPER

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith is the Appeal Brief in this application.

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R. Kader

Dated: July 18, 2007

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Dated: July 18, 2007 Signature: R. Kader
(Rabiya S. Kader)

Docket No.: POF 3.9-057 CONT
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Nui Wang

Application No.: 10/776,539 | Group Art Unit: 3683

Filed: February 9, 2004 | Examiner: B. T. King

For: DISC BRAKE CALIPER

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant hereby files this brief on Appeal to appeal from the final rejection of claims 1-7 and 8-11 mailed October 20, 2006. A Notice of Appeal was filed along with a petition for a two month extension of time on March 16, 2007.

REAL PARTY IN INTEREST

This application is assigned to PBR Australia Pty Ltd. Of 264 East Boundary Road, East Bentleigh, Victoria, Australia by the Assignment recorded September 10, 2004, at Reel 015129, Frame 0601.

RELATED APPEALS AND INTERFERENCES

No prior or pending appeals, interferences, or judicial proceedings are known to be related to, directly affect, or be

directly affected by, or have a bearing on, the Board's decision in the present appeal.

STATUS OF CLAIMS

This Application is a continuation of PCT/AU02/01067 filed August 8, 2002, claiming priority from an application filed in Australia having serial number PR6888, filed on August 21, 2001. The instant application was filed with 14 claims, of which claims 1 and 14 were independent. Claims 1-11 and 14 were originally rejected in an Office Action dated November 18, 2004. Claims 12 and 13 were objected to. A reply dated March 9, 2005 was filed, along with a petition for a one month extension of time, amending claims 1-7, 9-10 and 12-13 and cancelling claim 14. A second Office Action issued on June 8, 2005 rejecting claims 1-6, 8/2,8/3,8/4,8/5, and 8/6 and objecting to claims 7,8/7, and 9-13. A reply dated September 27, 2005, along with a petition for a one month Extension of Time, was filed in response to the second Office Action, amending claims 1, 2 and 9. A Requirement for Restriction/Election issued on December 14, 2005. A reply was filed on January 13, 2006 electing, with traverse, claims 1-6 and 8-13. A third Office Action issued on April 4, 2006 rejecting claims 1-6 and 8-11 and objecting to claims 12 and 13. A reply to the third Office Action was filed on August 4, 2006, along with a petition for a one month Extension of Time, without claim amendments. A final Office Action issued on October 20, 2006 maintaining the rejection of claims 1-6 and 8-11 and maintaining the objection to claims 12 and 13. Thus, claims 1-6 and 8-11 stand rejected and claims 12 and 13 stand objected to. The rejection of claims 1-6 and 8-11, along with the objection of claims 12 and 13 are the basis of the appeal.

STATUS OF AMENDMENTS

In response to the Final Office Action mailed October 20, 2006, a Notice of Appeal was filed. Claims 1-13 are set forth in the Appendix A attached hereto.

SUMMARY OF CLAIMED SUBJECT MATTER

The instant application relates generally to a disc brake caliper for automotive vehicles. In particular, the invention relates to a brake disc caliper having first and second mounting portions, a first brake pad mounted to the first mounting portion, a second brake pad mounted to the second mounting portion, a hydraulic service brake actuator and a non-hydraulic electric parking brake actuator, each of which is operable independently of the other.

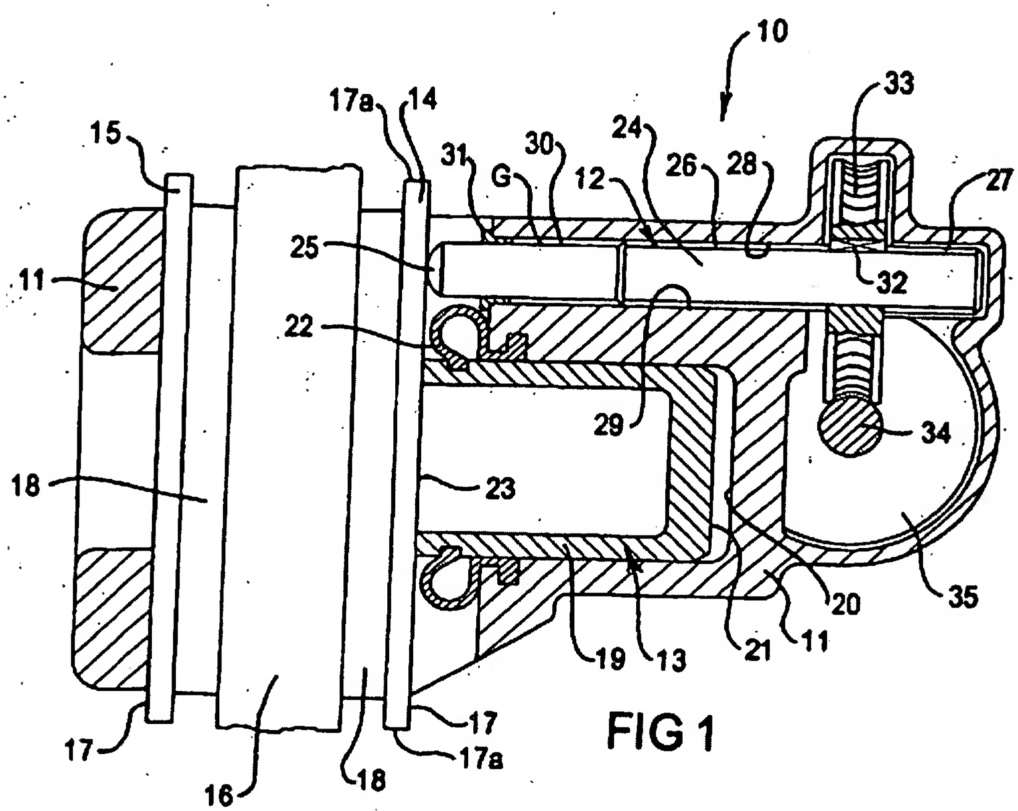

FIG 1

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The sole ground of rejection to be reviewed on appeal is whether claims 1-6 and 8-11 are anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 5,090,518 to Schenk (hereinafter "Schenk"). Claims 12 and 13 have been objected to, as being dependent on a rejected base claim.

ARGUMENT

As stated in the above "SUMMARY OF CLAIMED SUBJECT MATTER" section of this brief, the invention is directed to a disc brake caliper for automotive vehicles. In particular, the invention relates to a brake disc caliper having first and second mounting portions, a first brake pad mounted to the first mounting portion, a second brake pad mounted to the second mounting portion, a hydraulic service brake actuator and a non-hydraulic electric parking brake actuator, each of which is operable independently of the other. In particular, the brake disc caliper includes a hydraulic actuator for service brake actuation and an electric actuator for parking brake actuation. (Specification ¶ 0002, at p. 1). Both of the actuators are spaced apart from one another and are arranged for actuation against the rear of a disc brake pad. (Specification ¶ 0008, at p. 3). Because hydraulic actuators may leak, they are not suited for actuation during extended periods of time, such as in a parking brake mode. However, hydraulic actuators may be used for service brake applications because they are of far shorter duration.

One set of claims is at issue on appeal. Independent claim 1 and dependent claims 2-6 and 8-13 are directed to a disc brake

caliper that comprises first and second mounting portions, first and second brake pads, a hydraulic service brake actuator and a non-hydraulic electric parking brake actuator.

As stated above, claims 1-6 and 8-11 have been rejected as being anticipated under 35 U.S.C. § 102(b) by Schenk. Claims 12 and 13 have been objected to as being dependent on a rejected base claim. The objection to claims 12 and 13 will be addressed along with the rejection of claims 1-6 and 8-11.

Schenk is directed to a brake control system having two sets of primary and secondary actuating members. (Col. 1, ll. 5-10.) As seen in Fig. 1, the brake assembly 10 includes a rotatable rotor 12, a caliper housing 14, and an outboard brake shoe assembly 16 mounted on the caliper housing outer leg 18. The outboard brake shoe assembly 16 engages one side of rotor 12 when the brake is utilized. The assembly 10 also includes an inboard brake shoe assembly 20 which engages the other side of rotor 12 when the brake is utilized. (Col. 3, ll. 45-60)

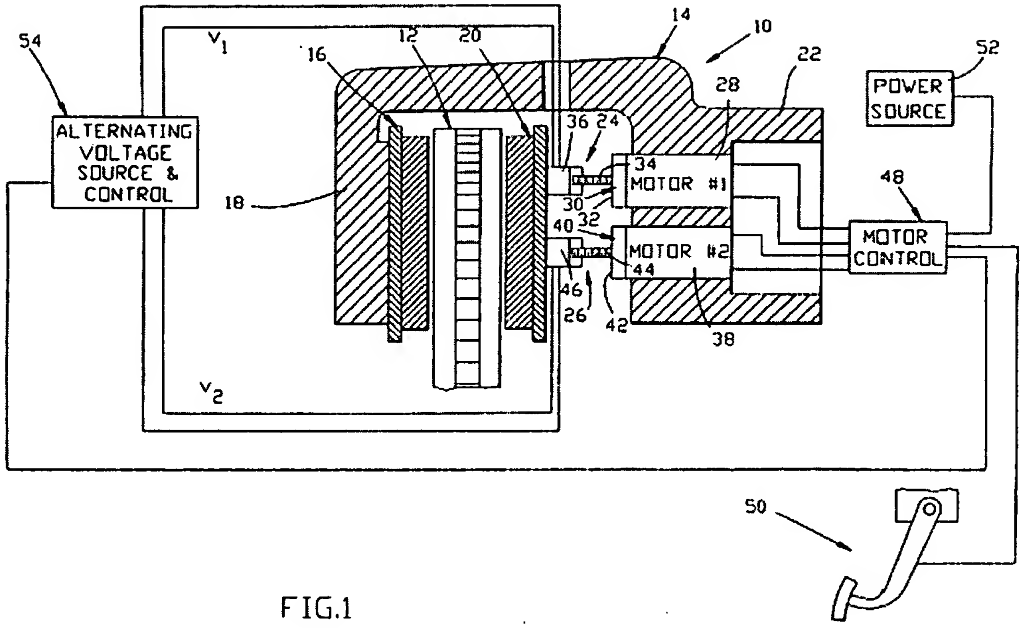

FIG.1

The brake assembly 10 is actuated by motor units 24 and 26. Motor unit 24 includes a reversible motor 28, labeled motor #1, an output drive 30 having a non-backdriveable linkage or output 32 formed by the rotatable internal drive threads of the output drive 30, and a motor output shaft 34. (Col. 4, ll. 6-35.) When motor 28 is energized, output drive 30 is driven in a rotatable direction and shaft 34 is driven axially. Motor 28 and output drive 30 define a first primary actuating unit. A piezoelectric crystal 36 is located between drive 30 and the brake shoe assembly 20. Crystal 36 defines a first secondary actuating unit and is a part of motor unit 24. (*Id.*)

Similarly, motor unit 26 includes a reversible motor 38, labeled motor #2, an output drive 40 also having a non-backdriveable linkage or output 42, and a motor output shaft 44. When motor 38 is energized, output drive 30 is driven in a rotatable direction and shaft 44 is driven axially. Motor 38 and

output drive 40 define a second primary actuating unit while a second piezoelectric crystal or element 46 defines a second secondary actuating unit. Crystal 46 is located axially between drive 40 and the brake shoe assembly 20 and is also a part of motor unit 26. (Col. 4, ll. 36-56.)

Motors 28 and 38 are controlled by motor control 48, which is controlled by a brake pedal assembly 50. Motor control 48 is powered by power 52. (Col. 4, ll. 56-68.)

Schenk's FIG. 2 illustrates operation of the brake assembly 10 during a full brake apply from the brake fully released condition, and FIG. 3 illustrates operation of the brake assembly 10 during a full brake release following the full brake apply of FIG. 2. Power voltages V_1 and V_2 are applied to and removed from the crystals 36 and 46 in a 180° phase relation; when power voltage V_1 is on, power voltage V_2 is off. (Col. 5, ll. 7-19.) When energized, the crystals expand and supply a great deal of force.

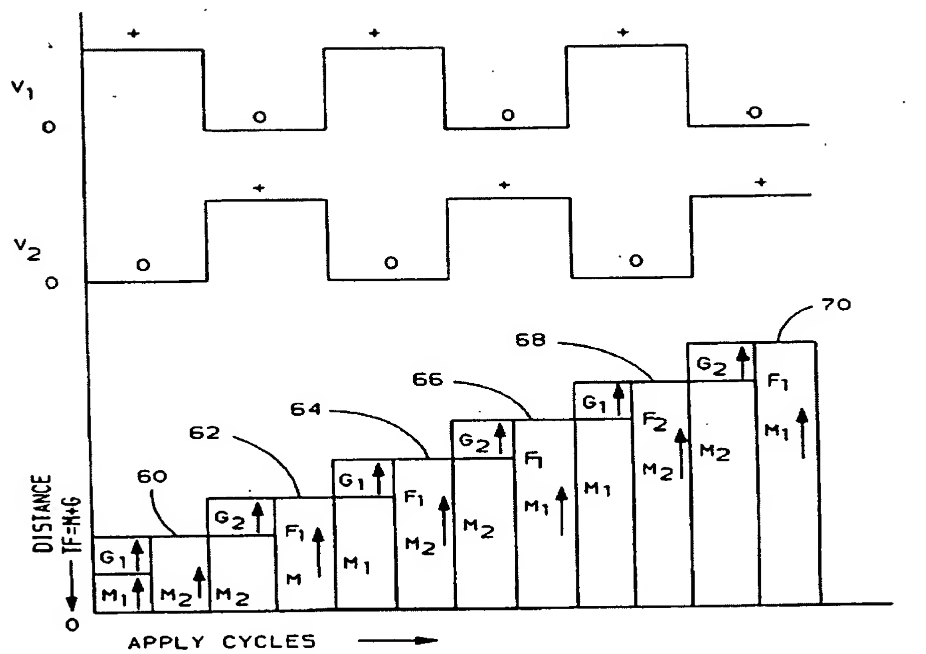

FIG.2

Following is a list of the labels used in the following discussion relating to FIGS. 1 and 2.

TF=Total Force of brake apply or release at any moment in time.

TF_a=apply force

TF_r=brake release force

M=motor apply force

M_x=M that a motor can deliver

M_1=M exerted by motor #1

M_2=M exerted by motor #2

G=movement and force attributed to axial crystal

G_1=G of crystal 36

G_2=G of crystal 46

C=Movement and force attributed to crystal contraction

C_1=C of crystal 36

C_2=C of crystal 46

As described in the application:

Motors 28 and 38 are energized in the brake apply direction when the motor control 48 is activated, rotating **both** screw output drives 30 and 40 and driving shafts 34 and 44, crystals 36 and 46 and shoe assembly 20 toward rotor 12. **At the same time**, crystal 36 is energized, and has an axial growth G_1 that has the effect of axially lengthening shaft 34 **relative** to the length of shaft 44. Shoe assembly 20 frictionally engages rotor 12 and the brake apply force is increased until **motors** 28 and 38 either reach **their** maximum force outputs or their controlled maximum force outputs M_1 **and** M_2. However, because of the crystal growth G_1 of energized crystal 36, but no crystal growth of deenergized crystal 38, the motor shaft 34 does not move axially quite as far (by the amount G_1) as does the motor shaft 44. Yet the **total movement** of the outer faces of the **crystals 36 and 46** where they engage the brake shoe assembly 20 is the same for each motor, being M_1+ G_1 for unit 24 and M_2 for unit 26. At this point, each motor is exerting the same force on the brake shoe assembly, as graphically shown by line 60 in FIG. 2 in the schematic first half of the schematic first cycle. Depending upon the length of time required for each motor to reach its maximum force output, and the frequency of the alternating voltage cycles, this may actually take several such cycles to attain this condition, but it is easier to graph and understand when presented as if

it occurs in the first half of the first cycle. [Emphasis supplied.]

(Col. 6, ll. 29-66).

Claim 1

Operable Independently

Appellants have repeatedly and consistently explained that Schenk does not teach all of the limitations of independent claim 1. Indeed, it does not teach or suggest the most critical features of that claim. Appellants have thus explained that Schenk does not teach "a hydraulic service brake actuator and a non-hydraulic electric parking brake actuator, each of which is operable independently of the other for service brake operation and parking brake operation" as claimed.

In the March 9, 2005 and August 4, 2006 amendments, appellants explained that although Schenk does disclose that the electric motor unit may be replaced by a hydraulic pressure actuator in order to provide a hybrid system, Schenk does not disclose that two sets of primary and secondary actuating units, no matter what their nature is, are operable independently of each other. (In the second Office Action, dated June 8, 2005 Schenk was not used to reject any of the pending claims.)

In the above section quoted from Schenk, emphasis has been supplied to language indicating that the motor units 24 and 26 work together and that Schenk does not disclose or teach that motor units 24 and 26 work independently of one another. Repeatedly, Schenk refers to "motors" and "crystals" using the plural term. Schenk also states "both", "at the same time", and states that one shaft moves "relative" to another. Such

terminology is found throughout Schenk. Not only does Schenk make no disclosure or teaching regarding using the motor units independently of one another, Schenk's very function would be inoperable if Schenk's brake assembly were to be operated in such a manner.

Further, as shown in FIG. 2 of Schenk, the two sets of primary and secondary actuating units are designed to work together in unison. The pair of actuators disclosed in *Schenk* of each set act in conjunction with one another. The relationship between the two sets is offset by 180°. Further, Schenk states that energization and deenergization of the two secondary actuating members (the crystals 36 and 46) alternate in opposite phase relation; *i.e.* when one is energized, the other one is not. (Col. 2, ll. 47-53). Thus, Schenk did not intend for the secondary actuating members to be independently operable nor are they capable of being independently operable.

In arguing that Schenk can be operated independently, the Examiner fails to show how Schenk's brake assembly could possibly function in such a manner. Schenk utilizes two motor units in alternating fashion. Schenk is only capable of "inching" up the clamping force and cannot provide the desired clamping force using just one motor unit. Thus, the rotor may not even be clamped using just one motor unit.

Generally, in simplified terms, the motor units 24 and 26 push the inboard brake assembly 20 into engagement with the rotor 12 and upon that engagement, the caliper housing 14 shifts to move the outer leg 18 and the associated outboard brake shoe assembly 16 to engage the opposite side of the rotor 12. The rotor 12 is thus clamped between the assemblies 16 and 20. The

motor units 24 and 26 move incrementally and at small distances to accomplish the task of clamping the rotor 12 between the inboard and outboard brake assemblies. Several, or even many incremental movements may be required to achieve a particular clamping load. In particular, with reference to FIG. 2, M_1 advances toward the rotor and crystal 36 is energized to expand (denoted by G_1) to take the total distance M_1 and G_1 of motor unit 24 to that denoted by line 60.

The crystal 36 has a finite extent of expansion. The clamp load generated by the crystal 36 is directly related to the extent of expansion. Once the crystal 36 stops expanding, no further clamp load can be generated by the motor unit 24. Thus, to increase the overall clamp load, at the same time as M_1 is advanced and crystal 36 expands, M_2 advances to line 60.

At this juncture, both motor units 24 and 26 have advanced to line 60, unit 24 by the combination of M_1 and G_1 and unit 26 solely by M_2. The applied clamp load is held, because the motor units 24 and 26 are non-backdriveable. Subsequently, crystal 36 is de-energized and thus contracts. This allows M_1 to advance further to take up the distance that crystal 36 contracts. Importantly, there is no loss of force or load applied to the brake shoe assemblies 16 and 20, because the load is held by M_2. Again, this is because each of motors 28 and 38 are non-backdrivable and so maintain the position to which they have been driven to. Thus, with crystal 36 de-energized, each of M_1 and M_2 are at the line 60.

To increase the applied load, crystal 46 is energized and thus expands a certain amount (denoted by G_2) beyond line 60. The total force TF applied therefore increases to line 62.

Because M_2 and G_2 has shifted to line 62, M_1 can shift to that line as well.

Once at the point denoted by 62, M_1 holds the applied load and crystal 46 contracts. M_2 then advances to take up the distance of contraction and at this time, both M_1 and M_2 are again at the same point, this time at the line 62. Two cycles or increments have been completed to this stage, such that the total distance TF of advancement of the motor units 24 and 26 has gone from zero to line 60, and then from line 60 to line 62. Thus, there has been an increase in load applied to the rotor from line 60 to line 62. The next cycle or increment shifts the total force to line 64 and so on to lines 66 and 68, and finally to line 70. However the various increases are only possible by operating the motor units 24 and 26 in unison or tandem. It will be appreciated, for example, that the shift from line 62 to line 64 is only possible because of the expansion of G_1,which allows M_2 to advance to line 64. M_2 can then hold at 64 while G_1 is de-energized and M_1 advances also to line 64. Thus, the incremental advancement of the applied load is cyclical and occurs incrementally and sequentially. Were only one motor unit to be used, the incremental advancement would not occur.

The motion of Schenk is similar to a person walking using two legs: one leg moves forward and the other leg clears that gap and then adds another distance. The first leg then does the same. Each leg may be considered an actuator having a limited amount of stroke. Both legs need to obtain the maximum stroke in order to advance. Each leg can only go so far, but together, they can travel great distances.

Such a motion would not be possible if, as the Examiner asserts, one of the motor units was configured to function *independently*. The Examiner fails to show how the force with which the brake shoe assemblies 16 and 20 engage the rotor would be increased if only one motor unit was used. In fact, it is not possible. For example, M_1 would reach its maximum, as would G_1 and no further force increase would be achievable. The Examiner does not present an argument and, simply put, Schenk does not teach or suggest how a single motor unit can achieve what the two motor units achieve. Thus, using only one motor unit would render Schenk's motor capable only of clamping the rotor to line 60 as shown in FIG. 2. Schenk would not suggest such a mechanism. In essence, the Examiner's theory would leave a person having just one leg with no way to advance forward, because it is not possible to make up the additional displacement required.

Schenk's configuration is useful for the ability to take advantage of the capabilities of both piezoelectric crystals and small motors. Schenk utilizes small motors for their ability to provide large displacements, even though the motors are not capable of providing large forces. In contrast, crystals do just the opposite: though not able to provide large displacements, they provide large forces.

Thus, the Schenk configuration optimizes the advantages of both motors and crystals. Replacing the motors with hydraulic actuators returns Schenk's configuration to that of a traditional hydraulic brake. However, adding a hydraulic brake adds much greater complexity to the brake assembly, and is neither practical nor feasible.

Piezoelectric crystal is redundant

Were the motors 28 and/or 38 replaced by a hydraulic actuator, the crystals would become redundant. Schenk's configuration is advantageous for low pressure requirements. The motors provide quick advancement under low load while the crystals provide very small advancement but very high load. If a hydraulic actuator is utilized, a source of high pressure is required, removing and nullifying the advantages derived from using the crystals. Thus, if the crystals become redundant and therefore, of no use, replacing motors 28 and/or 38 with hydraulic actuators converts Schenk's brake assembly into a more traditional hydraulic brake. Thus, if a high pressure source is available such as that accompanying a hydraulic actuator, a crystal is not necessary. Therefore, if Schenk truly contemplated a hybrid hydraulic/crystal system, it would only be in the limited situation of not having sufficient pressure (or if the piston area of engagement with the rear of the brake pads is too small) within the system. If there is sufficient pressure present, the crystals would not be utilized. If the pressure is low, but there is a large piston area, a large force can be generated, however the assembly is then very bulky.

Use of a hydraulic actuator for parking brake application is not only undesirable, it is illegal. To the contrary, the current application calls for separate "hydraulic service brake actuator and a non-hydraulic electric parking brake actuator," as recited in claim 1. Thus, use of a hydraulic actuator for parking brake applications could not have been contemplated, nor is it taught or suggested.

Non-backdriveable

Further, Schenk's primary actuating members of brake member sets each have a non-backdriveable driveline. (Col. 2, ll. 13-14). Hydraulic actuators are inherently backdriveable. Backdriving refers to the fact that when a forward driving force acting on an actuator is released, the actuator will instantly start to return or "backdrive", i.e. the actuator does not hold its position when the forward driving force is released. In a backdriveable actuator, no additional energy is required to backdrive it. Thus, the actuator has the ability to release pressure without additional energy being required. For example, screws can be backdriveable or non-backdriveable by careful selection of the screw thread. Most screws are non-backdriveable, i.e. a common screw and nut. The nut can be tightened onto the screw and will not release on its own. That is, in order to release it, deliberate action is required.

Parking brakes must be nonbackdriveable so that the parking brake load does not release when it is not intended to be released. Hydraulic service brake actuators are backdriveable when the hydraulic load is released, by removal of brake pedal pressure, i.e. by the vehicle driver lifting or relaxing his or her foot from the brake pedal. In addition, hydraulic actuators can backdrive because they rely on hydraulic pressure being retained by seals which can leak. This latter form of backdriving can occur very slowly, so that clamp load can reduce over time, such as overnight, and the obvious result is that parking brakes which hold securely when applied, may release several hours later. Replacing one of the electric actuators of Schenk with a hydraulic actuator would result in a backdriveable

primary actuating driveline, teaching away from the non-backdriveable motors 28 and 38 of Schenk. Schenk requires that both of the motor units be non-backdriveable. In particular, Schenk states that the force value of G_2 is added to the force value of M_2 because the motor 38 is non-backdriveable. (Col. 7, ll. 2-10). Were one of the motors to be replaced by a hydraulic pressure actuator, this would not be possible because a hydraulic pressure actuator is not safely or reliably non-backdriveable. The likelihood of backdriving of a hydraulic actuator is particularly high, when the hydraulic load is to be maintained long term, such as occurs in parking brakes. Thus, replacing Schenk's motor 28 or 38 with a hydraulic actuator in effect renders Schenk's motors ineffective and teaches away from Schenk.

Hydraulic parking brakes are illegal

Hydraulic parking brakes are illegal in many countries, including the United States, because hydraulic actuators have a tendency to leak. Parking brakes are utilized for extended periods of time and are loaded for the entire duration of such use. Thus, during use, the parking brake pressure is constant. Hydraulic actuators are not appropriate and are a liability in such an instance. Legislation prohibiting the use of hydraulic parking brakes in automobiles has been in effect for many decades. Therefore, Schenk would not have contemplated, and therefore cannot teach, the use of a hydraulic pressure actuator in a parking brake application.

Power

Schenk also discloses the use of small electric motors with piezoelectric crystals because Schenk prefers a low power application. Piezoelectric crystals are advantageous for applications where little power is supplied because these crystals are potentially capable of providing a great deal of force over a small length of displacement. Furthermore, small motors require very little space and may be ideal for small spaces such as brake assemblies.

Thus, Schenk can utilize small motors along with crystals, for low power consumption, lower pressure, compact size brakes. Adding a hydraulic actuator adds much greater complexity, size and larger power consumption to the brake assembly.

Functional Language

In the Office Actions dated April 4, 2006 and October 20, 2006 the Examiner cites M.P.E.P. § 2114 for the proposition that functional language fails to impart any structure to the claims. The Examiner states "'operable independently of the other for service brake operation and parking brake operation' is a property of the brake control system, not a structural feature of the caliper itself." (Office Action dated Oct. 20, 2006 p. 4.)

However, an "[a]pplicant may use functional language, alternative expressions, negative limitations, or any style of expression or format of claim which makes clear the boundaries of the subject matter for which protection is sought." M.P.E.P. § 2173.01. Further, the M.P.E.P. states, "[a] functional

limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms." M.P.E.P. § 2173.05 (g). Therefore, "[a] functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used." (Id.)

As noted by the court in *In re Swinehart*, a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. 439 F.2d 210, 169 USPQ 226 (C.C.P.A. 1971). In fact, the court added, functional language does not, in and of itself, render a claim improper. (Id.)

Further, in *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, the court noted that the claim term "operatively connected" is "a general descriptive [claim] term frequently used in patent drafting to reflect a functional relationship between claimed components," that is, the term "means the claimed components must be connected in a way to perform a designated function." 381 F.3d 1111, 1117-20, 72 U.S.P.Q. 2d 1001, 1006-08 (Fed. Cir. 2004). "In the absence of modifiers, general descriptive terms are typically construed as having their full meaning." Id. at 1118, 72 U.S.P.Q. 2d at 1006. The court added that, in the patent claim at issue, "subject to any clear and unmistakable disavowal of claim scope, the term 'operatively connected' takes the full breath of its ordinary meaning, *i.e.*, 'said tube [is] operatively connected to said

cap' when the tube and cap are arranged in a manner capable of performing the function of filtering." Id. at 1120, 72 U.S.P.Q. 2d at 1008.

"Operatively connected" is similar to "operable independently," as recited in claim 1 and deserves the same weight the court afforded "operatively connected". The term "operable independently," serves to precisely define the present structural attributes of interrelated component parts of the claimed assembly, as required by the M.P.E.P. Therefore, the term "operable independently" should be given patentable weight and distinguishes the current claims over Schenk.

In addition, similar functional language was given patentable weight in *Ex parte Mitchell,* 30 U.S.P.Q. 94, 95 (B.P.A.I. 1936). The phrase that "the conveyer members are adapted to engage simultaneously each of the seam-portions of the fabric at their initially encountered ends and carry engaged portions along convergent lines," was determined to be structural by the Board of Patent Appeals and Interferences. (*Id.*)

More recently, the Federal Circuit has interpreted allegedly functional language in an apparatus claim as requiring that an accused apparatus possesses the capability of performing the recited function. *Intel Corp. v. U.S. Int'l Trade Comm'n,* 946 F.2d 821, 832 (Fed. Cir. 1991). Thus, since "independently operable" cannot be performed by the accused apparatus, "independently operable" is not functional language, but rather structural. The term the court dealt with is nearly identical to the term "operable independently," used in the current claims. Therefore, the term "independently operable" must be

given patentable weight, and the examiner's overly restrictive refusal to consider this language shall not be upheld

Claim 2

Claim 2 recites, "[t]he disc brake caliper according to claim 1, wherein said hydraulic service brake actuator includes a hydraulic actuating member and said non-hydraulic electric parking brake actuator includes an electric actuating member, wherein said hydraulic actuating member and said electric actuating member are arranged to engage said second side of said first brake pad at said spaced apart positions." Claim 2 is allowable for at least the same reasons as claim 1.

Claim 3

Dependent claim 3 recites, "[t]he disc brake caliper according to claim 2, further comprising a friction lining disposed on said first brake pad, wherein said hydraulic service brake actuator is arranged to engage said second side of said first brake pad at a position on said first brake pad to cause said friction lining to apply a substantially even pressure to the disc brake rotor across a face of said friction lining which engages the disc brake rotor." Claim 3 is allowable for at least the same reasons as claims 1 or 2.

Claim 4

Dependent claim 4 recites, "[t]he disc brake caliper according to claim 3, wherein said hydraulic actuating member is arranged to engage said second side of said first brake pad in the region of the effective pressure centre of said first brake pad and said electric actuating member being arranged to engage said second side of said first bake pad eccentrically relative

to said hydraulic actuating member." Claim 4 is allowable for at least the same reasons as claims 1, 2 or 3.

Further, Schenk does not teach or suggest, "hydraulic actuating member is arranged to engage said second side of said first brake pad in the region of the effective pressure centre of said first brake pad" or that "said electric actuating member being arranged to engage said second side of said first bake pad eccentrically relative to said hydraulic actuating member." Schenk makes no mention regarding the spacing of the motor units with respect to the brake pad.

The Examiner merely states that "actuator 38 is arranged in 'the region' of the effective pressure centre as broadly recited." (Office Action Oct. 20, 2006, p. 3). Further, the Examiner provides no support for the assertion that Schenk teaches "said electric actuating member being arranged to engage said second side of said first bake pad eccentrically relative to said hydraulic actuating member." Schenk simply does not teach or suggest either of these features. In fact, Schenk makes no mention of spacing of the motor units at all.

Furthermore, Schenk makes no mention of where the "effective pressure centre of said brake pad" is. Therefore, Schenk cannot teach actuating members spaced relative to the "effective pressure centre of said brake pad."

Claim 5

Dependent claim 5 recites, "[t]he disc brake caliper according to claim 3, wherein said hydraulic actuating member is arranged to engage said second side of said first brake pad at a position generally centrally of said first brake pad and said electric actuating member is arranged to engage said second side

of said first brake pad eccentrically relative to said hydraulic actuating member." Claim 5 is allowable for at least the same reasons as claims 1, 2 or 3.

Once again, the Examiner merely states "actuator 38 is 'generally centrally' of the pad as broadly recited." (Office Action Oct. 20, 2006, p. 3). The Examiner provides no support for this proposition because, simply put, there is none. Moreover, Schenk makes no mention of the spacing of the motor units at all.

With reference to Fig. 1 neither of the motor units is near the center.

Claim 6

Dependent claim 6 recites, "[t]he disc brake caliper according to claim 5, wherein said electric actuating member is arranged to engage said second side of said first brake pad closer to an outside edge of said first mounting portion than said hydraulic actuating member." Claim 6 is allowable for at least the same reasons as claim 1, 2, 3 or 5.

Once again, the Examiner fails to provide any support for his assertion. The Examiner refers to the caliper housing inboard leg 22 as the first mounting portion. (Office Action Oct. 20, 2006, p. 2). Under such an interpretation, the caliper housing inboard leg 22 does not have an outside edge in relation to either of the actuating members. However, if an edge adjacent the motor control 48 is considered an outside edge, neither of the actuating members are closer to the outside edge than the other actuating member because both of the actuating members are spaced at the same distance away from "an outside edge" of said first mounting portion (caliper housing inboard

leg 22). Therefore, Schenk cannot teach or suggest, "said electric actuating member is arranged to engage said second side of said first brake pad closer to an outside edge of said first mounting portion than said hydraulic actuating member," as recited in claim 6. [Emphasis supplied.]

Claim 7

Dependent claim 7 recites, "[t]he disc brake caliper according to claim 2, further comprising a friction lining disposed on said first brake pad, wherein said hydraulic service brake actuator includes a pair of hydraulic actuating members disposed generally symmetrically on either side of a generally central position of said first brake pad, said pair of hydraulic actuating members adapted for engaging said second side of said first brake pad at positions to cause said friction lining of said first brake pad to apply a substantially even pressure to the disc brake rotor across a face of said friction lining, said electric actuating member being disposed substantially midway between said pair of hydraulic actuating members and substantially centrally of said first brake pad." Claim 7 is allowable for at least the same reasons as claims 1 or 2.

Further, Schenk does not teach or suggest, "said hydraulic service brake actuator includes a pair of hydraulic actuating members disposed generally symmetrically on either side of a generally central position of said first brake pad." As previously mentioned, Schenk makes no mention of the spacing of the actuating members and once again the Examiner fails to support his contention that Schenk teaches this feature. Again, with reference to Fig. 1, neither of the motor units is disposed generally symmetrically on either side of the first brake pad.

In the absence of Schenk's teaching to the contrary, the Examiner cannot presume that Fig. 1 teaches these aspects of claim 5.

Furthermore, Schenk does not teach or suggest, "said pair of hydraulic actuating members adapted for engaging said second side of said first brake pad at positions to cause said friction lining of said first brake pad to apply a substantially even pressure to the disc brake rotor across a face of said friction lining." Schenk makes no mention of the spacing of the actuating members and once again the Examiner fails to support his contention that Schenk teaches this feature. Again, with reference to Fig. 1, both of the motor units are eccentric of the center of the brake pad and therefore they cannot provide an "even pressure." Therefore, Schenk cannot teach or suggest this feature.

Finally, Schenk does not teach or suggest, "electric actuating member being disposed substantially midway between said pair of hydraulic actuating members." The Examiner again fails to provide support for this contention. Although Schenk states that the electric motors may be replaced by a hydraulic actuator, Schenk teaches only two such motors. The recited claim terms require three actuating members: an electric actuating <u>member</u> disposed between a <u>pair</u> of hydraulic actuating members. [Emphasis supplied.] Therefore, Schenk does not teach or suggest claim 7 as recited.

Claim 8

Dependent claim 8 recites, "[t]he disc brake caliper according to any one of claims 2 to 7, wherein said hydraulic actuating member is a hydraulic piston." Claim 8 is allowable for at least the same reasons as claims 1, or 2 to 7.

Furthermore the Examiner does not provide any support for this contention. Additionally, Schenk makes no mention of a hydraulic piston. Therefore, Schenk does not teach or suggest claim 8 as recited.

Claim 9

Dependent claim 9 recites, "[t]he disc brake caliper according to any one of claims 2 to 3, wherein said electric actuating member of said non-hydraulic electric parking brake actuator is an elongate rod having a lengthwise axis." Claim 9 is allowable for at least the same reasons as claims 1, 2 or 3. Neither the Examiner nor Schenk support the contention that Schenk teaches or suggests claim 9 as recited.

Claim 10

Dependent claim 10 recites, "[t]he disc brake caliper according to claim 9, wherein said elongate rod includes a disc brake pad engaging portion for cooperating with an electric drive unit, said electric drive unit spaced from said disc brake pad engaging portion, said cooperation permitting said electric drive unit to displace said elongate rod toward and away from the disc brake rotor for parking brake actuation and release." Claim 10 is allowable for at least the same reasons as claims 1, 2, 3 or 9.

Once again, the Examiner does not provide support for this contention. Schenk makes no mention of an electric drive unit. Therefore, Schenk does not teach or suggest claim 10 as recited.

Claim 11

Dependent claim 11 recites, "[t]he disc brake caliper according to claim 10, wherein said electric drive unit is operable to displace said elongate rod axially by rotating said elongate rod about said lengthwise axis." Claim 11 is allowable for at least the same reasons as claims 1, 2, 3, 9 or 10.

Again, the Examiner does not provide support for this contention. Schenk makes no mention of an electric drive unit. Therefore, Schenk does not teach or suggest claim 10 as recited.

Claim 12

Dependent claim 12 recites, "[t]he disc brake caliper according to claim 11, further comprising a bore in said housing, a pair of mating threads disposed on said elongate rod and a wall at least partly defining said bore, wherein said elongate rod is disposed at least partly within said bore whereby said elongate rod is in threaded engagement with said bore, and whereby rotation of said elongate rod about said lengthwise axis causes an axial shift of said elongate rod relative to said bore." Applicant agrees with the Examiner that Schenk fails to disclose a bore, rod, or and the arrangement as recited.

Claim 13

Dependent claim 13 recites, "[t]he disc brake caliper according to claim 12, said cooperation includes a worm gear fixed to said elongate rod and a worm driven by said electric drive unit, said worm cooperating with said worm gear." Applicant agrees with the Examiner that Schenk fails to disclose a gear, rod, or the arrangement as recited.

Conclusion

In view of the above, appellants submit that claims 1-6 and 8-13 are patentably distinguishable over Schenk. Therefore, allowance of claims 1-6 and 8-13 is respectfully requested.

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Respectfully submitted,

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APPENDIX A - CLAIMS

1. (previously presented) A disc brake caliper, for use with a disc brake rotor having a first side and a second side, the disc brake caliper comprising:

a first mounting portion and a second mounting portion, said first mounting portion adapted for being disposed adjacent the first side of the disc brake rotor and said second mounting portion adapted for being disposed adjacent the second side of the disc brake rotor;

a first brake pad mounted to said first mounting portion and having a first side adapted for engaging the disc brake rotor and a second side opposite to said first side and a second brake pad mounted to said second mounting portion, said first brake pad and said second brake pad being adapted for being positioned adjacent opposite sides of the disc brake rotor in facing relationship therewith; and

a hydraulic service brake actuator and a non-hydraulic electric parking brake actuator, each of which is operable independently of the other for service brake operation and parking brake operation, respectively, each of said actuators being arranged for actuation against said second side of said first brake pad for displacing said first brake pad away from said first mounting portion and into engagement with the disc brake rotor, said hydraulic service brake actuator and said non-hydraulic electric parking brake actuator having positions of actuation on said second side of said first brake pad at positions which are spaced apart.

2. (previously presented) The disc brake caliper according to claim 1, wherein said hydraulic service brake actuator includes a hydraulic actuating member and said non-hydraulic electric parking brake actuator includes an

electric actuating member, wherein said hydraulic actuating member and said electric actuating member are arranged to engage said second side of said first brake pad at said spaced apart positions.

3. (previously presented) The disc brake caliper according to claim 2, further comprising a friction lining disposed on said first brake pad, wherein said hydraulic service brake actuator is arranged to engage said second side of said first brake pad at a position on said first brake pad to cause said friction lining to apply a substantially even pressure to the disc brake rotor across a face of said friction lining which engages the disc brake rotor.

4. (previously presented) The disc brake caliper according to claim 3, wherein said hydraulic actuating member is arranged to engage said second side of said first brake pad in the region of the effective pressure centre of said first brake pad and said electric actuating member being arranged to engage said second side of said first bake pad eccentrically relative to said hydraulic actuating member.

5. (previously presented) The disc brake caliper according to claim 3, wherein said hydraulic actuating member is arranged to engage said second side of said first brake pad at a position generally centrally of said first brake pad and said electric actuating member is arranged to engage said second side of said first brake pad eccentrically relative to said hydraulic actuating member.

6. (previously presented) The disc brake caliper according to claim 5, wherein said electric actuating member is arranged to engage said second side of said first brake pad

closer to an outside edge of said first mounting portion than said hydraulic actuating member.

7. (previously presented) The disc brake caliper according to claim 2, further comprising a friction lining disposed on said first brake pad, wherein said hydraulic service brake actuator includes a pair of hydraulic actuating members disposed generally symmetrically on either side of a generally central position of said first brake pad, said pair of hydraulic actuating members adapted for engaging said second side of said first brake pad at positions to cause said friction lining of said first brake pad to apply a substantially even pressure to the disc brake rotor across a face of said friction lining, said electric actuating member being disposed substantially midway between said pair of hydraulic actuating members and substantially centrally of said first brake pad.

8. (original) The disc brake caliper according to any one of claims 2 to 7, wherein said hydraulic actuating member is a hydraulic piston.

9. (previously presented) The disc brake caliper according to any one of claims 2 to 3, wherein said electric actuating member of said non-hydraulic electric parking brake actuator is an elongate rod having a lengthwise axis.

10. (previously presented) The disc brake caliper according to claim 9, wherein said elongate rod includes a disc brake pad engaging portion for cooperating with an electric drive unit, said electric drive unit spaced from said disc brake pad engaging portion, said cooperation permitting said electric drive unit to displace said elongate rod toward and away from the disc brake rotor for parking brake actuation and release.

11. (original) The disc brake caliper according to claim 10, wherein said electric drive unit is operable to displace said elongate rod axially by rotating said elongate rod about said lengthwise axis.

12. (previously presented) The disc brake caliper according to claim 11, further comprising a bore in said housing, a pair of mating threads disposed on said elongate rod and a wall at least partly defining said bore, wherein said elongate rod is disposed at least partly within said bore whereby said elongate rod is in threaded engagement with said bore, and whereby rotation of said elongate rod about said lengthwise axis causes an axial shift of said elongate rod relative to said bore.

13. (previously presented) The disc brake caliper according to claim 12, said cooperation includes a worm gear fixed to said elongate rod and a worm driven by said electric drive unit, said worm cooperating with said worm gear.

14. (cancelled)

APPENDIX B - EVIDENCE

None

APPENDIX C - RELATED PROCEEDINGS

None